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128710

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24-02-1999

תאריך:
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הוקדם/נדחה
Ante/Post-dates

חוק הפטנטים, התשכ"ז -- 1967
PATENTS LAW, 5727-1967

ב ק ש ה ל פ ט נ ט

Application for Patent

C:32983

אני, (שם המבקש, מענו -- ולגבי גוף מאוגד -- מקום התאגדותו)

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הממציא: יהודה ימאי

By Assignment

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בעל אמצאה מכח העברה

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מתקן אריזה

(בעברית)

(Hebrew)

PACKAGING APPARATUS

(באנגלית)

(English)

hereby apply for a patent to be granted to me in respect thereof

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* בקשה חלוקה - Application for Division		* בקשת פטנט מוסף - Application for Patent of Addition		* דרישה דין קדימה Priority Claim		
מבקשת פטנט from Application		* לבקשה/לפטנט to Patent/Appl.		מספר/סימן Number/Mark	תאריך Date	מדינת האיגוד Convention Country
No. _____ מס. _____ dated _____ מיום _____		No. _____ מס. _____ dated _____ מיום _____				
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מתקן אריזה

PACKAGING APPARATUS

HEFESTUS LTD.

Inventor: Yehuda Yamai

C:32983

הפסטוס בע"מ

הממציא: יהודה ימאי

PACKAGING APPARATUS FIELD OF THE INVENTION

The present invention relates generally to packaging apparatus and particularly to packaging apparatus for sealing a generally rigid container so as to seal therein foodstuffs under vacuum or inert atmosphere in order to prolong shelf-life thereof.

BACKGROUND OF THE INVENTION

In the food packaging industry, there are three broad categories of packages for sealing therein foodstuffs. The first category comprises flexible packages usually made of flexible plastic sheets bonded or otherwise joined together, such as the familiar hard yellow cheese packages. The second category comprises so-called semi-rigid packages usually made of a semi-rigid shallow container with a flexible plastic sheet cover bonded or otherwise joined thereto, such as smoked fish or meat packages. The third category comprises so-called rigid packages usually made of a rigid plastic container with a rigid plastic cover, such as the familiar cottage cheese containers.

All the above packages must be sealed under vacuum or inert atmosphere in order to prolong the shelf-life of the foodstuff contained therein. The flexible and semi-rigid packages are generally sealed in the art by sucking out air from within, while at the same time introducing inert gases, such as nitrogen or carbon dioxide. (It is noted that the term "inert" in this context refers to a chemically inactive or unreactive substance.) The package is then sealed under vacuum or inert atmosphere. As is well known in the art, the removal of oxygen prolongs the shelf-life by preventing oxidation processes which can spoil food and by preventing growth of aerobic organisms such as fungi. While this method is acceptable for flexible and semi-rigid packages, it is not, however, applicable for rigid containers because the suction forces generally cause buckling of the container. Therefore, in the prior art, rigid containers are generally sealed by placing the entire container in a housing. A vacuum is then created in the housing and the container is sealed. This method is disadvantageous because it is relatively time-consuming and costly as compared to the method described above for flexible and semi-rigid packages.

SUMMARY OF THE INVENTION

The present invention seeks to provide improved packaging apparatus which enables sealing rigid containers with virtually the same type of method used for flexible and semi-rigid packages. The present invention not only seals the rigid containers quickly and

inexpensively, but synergistically prolongs shelf-life of the foodstuffs packaged therein, such as cottage cheese or salads.

5 Rigid containers have a body portion which contains the foodstuff, and a head portion extending from the body portion. The present invention achieves the desired vacuum sealing by drawing unwanted fluids from the head portion and then sealing the container. The packaging apparatus of the present invention includes a container receiving member that receives and supports the head portion of the generally rigid container, and a multi-press assembly which creates a sealed volume in which the head portion is substantially sealingly enclosed, evacuates undesirable fluids (generally air) from the head portion and seals the
10 container, as will be described in detail hereinbelow.

There is thus provided in accordance with a preferred embodiment of the present invention packaging apparatus for sealing a generally rigid container that has a head portion characterized by a height and a body portion extending from the head portion, the apparatus including a container receiving member that receives and supports the head portion
15 of the generally rigid container, and a multi-press assembly which creates a sealed volume in which the head portion is substantially sealingly enclosed, evacuates undesirable fluids from the head portion and seals the container.

In accordance with a preferred embodiment of the present invention the multi-press assembly includes a first clamping ring which slides axially with respect to the container receiving member, the first clamping ring being operative to abut substantially sealingly against
20 the container receiving member, the first clamping ring having an inlet valve and an exit valve formed therein, the valves when closed substantially preventing fluid flow therethrough, a second clamping ring which slides axially with respect to the first clamping ring, a sealing material placed between the first and second clamping rings, the second clamping ring being
25 operative to press the sealing material substantially sealingly against the first clamping ring, thereby defining a substantially sealed volume bounded by the first clamping ring, the inlet and exit valves, and the sealing material, and a sealing head which slides axially with respect to the container receiving member, the sealing head being operative, when moved axially against the head portion, to sealingly join the sealing material to the head portion.

30 Further in accordance with a preferred embodiment of the present invention the container receiving member is formed with a bore and a counterbore, the bore being adapted for the body portion of the container to pass therethrough, and the counterbore having a perimeter which defines a collar and a shoulder extending from a base of the collar to the bore,

the shoulder being adapted for supporting the head portion, and the container receiving member includes a flange extending radially outwards of the collar, the collar protruding axially from the flange.

Still further in accordance with a preferred embodiment of the present invention a cutting head is provided which slides axially with respect to the container receiving member, the cutting head being operative, when moved axially against the head portion, to cut a portion of the sealing material which radially extends beyond the head portion.

Additionally in accordance with a preferred embodiment of the present invention suction apparatus is provided in fluid communication with the exit valve for drawing unwanted fluids from the sealed volume via the exit valve.

Further in accordance with a preferred embodiment of the present invention a fluid source is provided in fluid communication with the inlet valve for introducing an inactive fluid into the sealed volume via the inlet valve.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Figs. 1-4 are simplified pictorial illustrations of packaging apparatus constructed and operative in accordance with a preferred embodiment of the present invention, wherein:

Fig. 1 illustrates a container receiving member and a multi-press assembly prior to sealing of a container, the multi-press assembly including first and second clamping rings;

Fig. 2 illustrates the second clamping ring of the multi-press assembly lowered to press a sealing material substantially sealingly against the first clamping ring, thereby defining a substantially sealed volume;

Fig. 3 illustrates a sealing head of the multi-press assembly lowered to press and sealingly join the sealing material to the head portion of the container; and

Fig. 4 illustrates a cutting head of the multi-press assembly lowered to cut a portion of the sealing material which radially extends beyond the head portion.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1 which illustrates packaging apparatus constructed and operative in accordance with a preferred embodiment of the present invention. Packaging apparatus 10 is designed to seal a generally rigid container 12 that has a head portion 14 characterized by a height H and a body portion 16 extending from head portion 14.

Head portion 14 may have a perimeter larger than that of body portion 16. Container 12 may have the shape shown in Fig. 1, such as that used for cottage cheese, but may have any other shape such as the shape of a plastic drinking cup, for example. Although container 12 is shown as being generally circular, it may have any kind of perimeter.

5 Packaging apparatus 10 preferably includes a container receiving member 20 which is formed with a bore 22 and a counterbore 24. Bore 22 and counterbore 24 are preferably coaxial, that is, share a common longitudinal axis 25. Bore 22 is adapted for body portion 16 to pass therethrough. The perimeter of counterbore 24 defines a collar 26 and a shoulder 28 extending from the base of collar 26 to bore 22. Shoulder 28 is adapted for
10 supporting head portion 14. Collar 26 preferably has a depth not greater than height H of head portion 14. Container receiving member 20 preferably also includes a flange 30 which extends radially outwards of collar 26. It is seen that collar 26 protrudes axially from flange 30, i.e., flange 30 is lower than the top of collar 26 in the sense of Fig. 1. Flange 30 is preferably, although not necessarily, generally coplanar with shoulder 28. An O-ring 32 is preferably
15 secured to an upper surface of flange 30.

A multi-press assembly 34 is provided which creates a sealed volume in which head portion 14 is substantially sealingly enclosed, evacuates undesirable fluids from head portion 14 and seals container 12, as is now described.

Multi-press assembly 34 preferably includes a first clamping ring 36 which
20 slides axially with respect to flange 30. Collar 26 is preferably sized to be radially inwards of first clamping ring 36. First clamping ring 36 preferably slides along posts 37 and is moved axially by a suitable actuator or servomotor well known in the art (not shown). First clamping ring 36 can be brought downwards in the sense of Fig. 1 to abut substantially sealingly against the O-ring 32 of flange 30. First clamping ring 36 preferably has an inlet valve 38 and an exit
25 valve 40 formed therein. Valves 38 and 40, when closed, substantially prevent fluid flow therethrough. An O-ring 42 is preferably secured to an upper surface of first clamping ring 36.

A second clamping ring 44 preferably slides axially with respect to first clamping ring 36. Second clamping ring 44 also preferably slides along posts 37 and is moved axially by the same or another actuator or servomotor (not shown).

30 A sealing material 46 is preferably placed between clamping rings 36 and 44. Sealing material 46 is preferably a thin sheet of plastic sealing wrap well known and widely used in the food industry.

Reference is now made to Fig. 2. Second clamping ring 44 has been lowered in the sense of the drawing to press sealing material 46 substantially sealingly against O-ring 42 of first clamping ring 36, thereby defining a substantially sealed volume 48 bounded by first clamping ring 36, inlet and exit valves 38 and 40, and sealing material 46.

5 Suction apparatus 50 is preferably provided in fluid communication with exit valve 40, and now draws unwanted fluids (generally air) from sealed volume 48 via said exit valve 40. A fluid source 52 is preferably in fluid communication with inlet valve 38, and introduces an inert fluid, such as nitrogen or carbon dioxide, into sealed volume 48 via said inlet valve 38, preferably at the same time as suction apparatus 50 sucks out the unwanted
10 fluids. Accordingly, sealed volume 48 and head portion 14 have now been rid of unwanted fluids. The sucking action is very quick so that foodstuffs are substantially prevented from being sucked out of body portion 16 into head portion 14. Additionally, collar 26 acts as a trap so that foodstuffs are substantially prevented from flowing into exit valve 40.

Reference is now made to Fig. 3. Multi-press assembly 34 preferably includes a
15 sealing head 54 which slides axially with respect to flange 30. In the illustrated embodiment, sealing head 54 is attached to a bridge member 55 secured to a piston 56 which is moved axially by an actuator or servomotor (not shown). Sealing head 54 is shown having been moved axially downwards in the sense of the drawing to press and sealingly join sealing material 46 to head portion 14. As used herein, "joined" refers to the situation wherein two
20 materials or elements are directly joined to one another or where they are indirectly joined to one another such as where both are joined to an intermediate element. Similarly, methods of joining two materials or elements include attaching the elements together such as through the use of adhesive, sonic or thermal bonding, and the like. Accordingly, the skilled artisan readily knows which type of sealing head to use depending on the type of joining method
25 selected.

Reference is now made to Fig. 4. Multi-press assembly 34 preferably includes a cutting head 58 which slides axially with respect to flange 30. In the illustrated embodiment, cutting head 58 is attached in spring-loaded fashion to bridge member 55, although the skilled artisan will appreciate that other attachment arrangements may also be employed. to which is
30 also attached sealing head 54. Cutting head 58 is shown having been moved axially downwards in the sense of the drawing to cut a portion of sealing material 46 which radially extends beyond head portion 14. Preferably, as is well known in the art, a tab of sealing material 46 is

left protruding radially outwards of container 12 to enable a customer to easily pull off sealing material 46 when the foodstuffs are to be consumed.

Packaging apparatus 10 thus efficiently seals container 12 with quick, successive actions all performed at one compact work station. The rigid container is sealed in virtually the same manner as flexible and semi-rigid containers.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention includes both combinations and subcombinations of the features described hereinabove as well as modifications and variations thereof which would occur to a person of skill in the art upon reading the foregoing description and which are not in the prior art.

CLAIMS

What is claimed is:

1. Packaging apparatus for sealing a generally rigid container that has a head portion characterized by a height and a body portion extending from the head portion, the apparatus comprising:

a container receiving member that receives and supports the head portion of the generally rigid container; and

a multi-press assembly which creates a sealed volume in which the head portion is substantially sealingly enclosed, evacuates undesirable fluids from the head portion and seals said container.

2. Packaging apparatus according to claim 1 wherein said multi-press assembly comprises:

a first clamping ring which slides axially with respect to said container receiving member, said first clamping ring being operative to abut substantially sealingly against said container receiving member, said first clamping ring having an inlet valve and an exit valve formed therein, said valves when closed substantially preventing fluid flow therethrough;

a second clamping ring which slides axially with respect to said first clamping ring,

a sealing material placed between said first and second clamping rings, said second clamping ring being operative to press said sealing material substantially sealingly against said first clamping ring, thereby defining a substantially sealed volume bounded by said first clamping ring, said inlet and exit valves, and said sealing material; and

a sealing head which slides axially with respect to said container receiving member, said sealing head being operative, when moved axially against said head portion, to sealingly join the sealing material to said head portion.

3. Packaging apparatus according to claim 1 or claim 2 wherein said container receiving member is formed with a bore and a counterbore, said bore being adapted for the body portion of the container to pass therethrough, and said counterbore having a perimeter which defines a collar and a shoulder extending from a base of said collar to said bore, said shoulder being adapted for supporting the head portion, and said container receiving member comprises a flange extending radially outwards of said collar, said collar protruding axially from said flange.

4. Packaging apparatus according to claim 2 or claim 3 further comprising a cutting head which slides axially with respect to said container receiving member, said cutting head being operative, when moved axially against said head portion, to cut a portion of the sealing material which radially extends beyond said head portion.

5. Packaging apparatus according to any of claims 2-4 further comprising suction apparatus in fluid communication with said exit valve for drawing unwanted fluids from said sealed volume via said exit valve.

6. Packaging apparatus according to any of claims 2-5 further comprising a fluid source in fluid communication with said inlet valve for introducing an inactive fluid into said sealed volume via said inlet valve.

7. Packaging apparatus according to any of the preceding claims and substantially as described hereinabove.

For the Applicant,

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FIG. 2

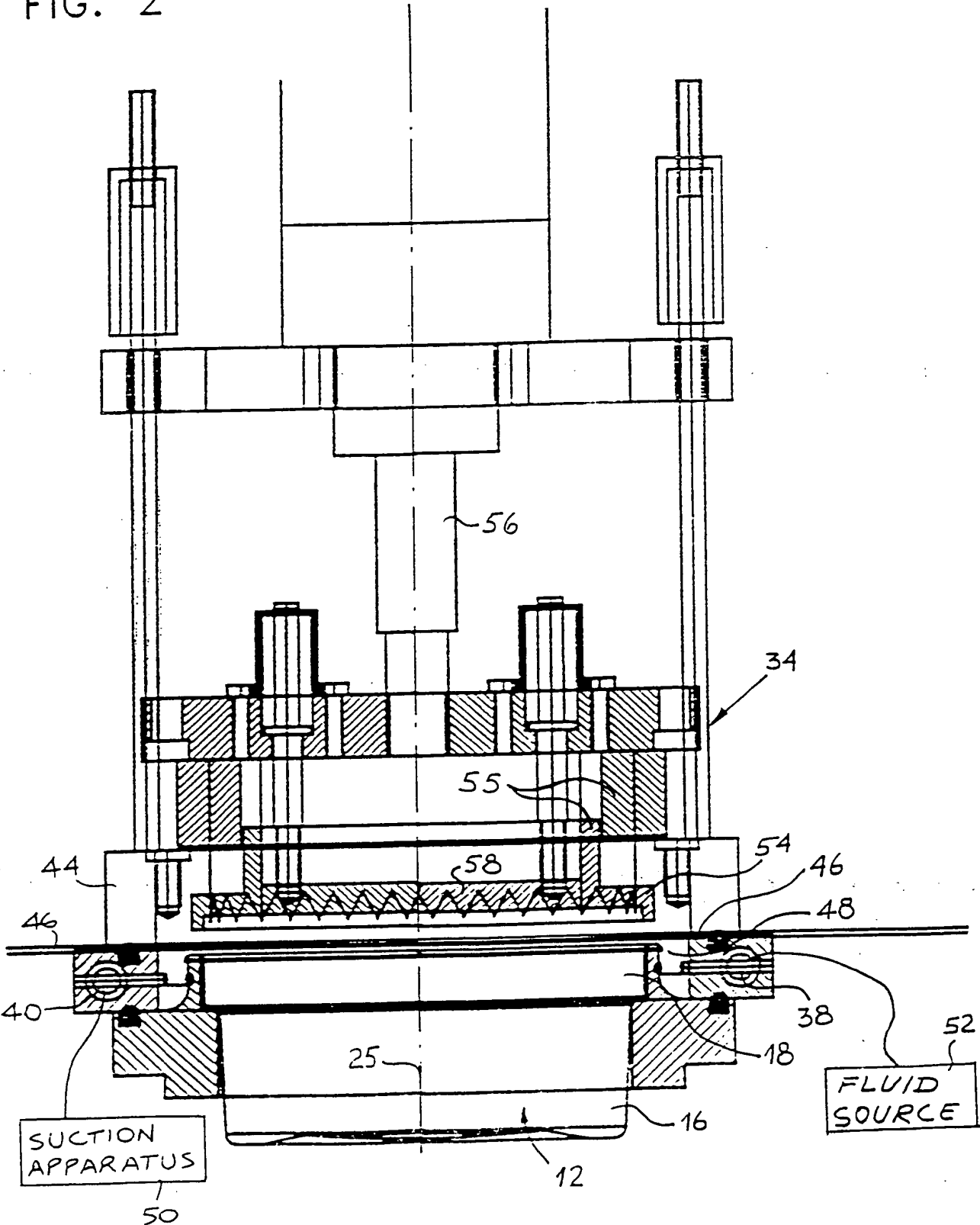
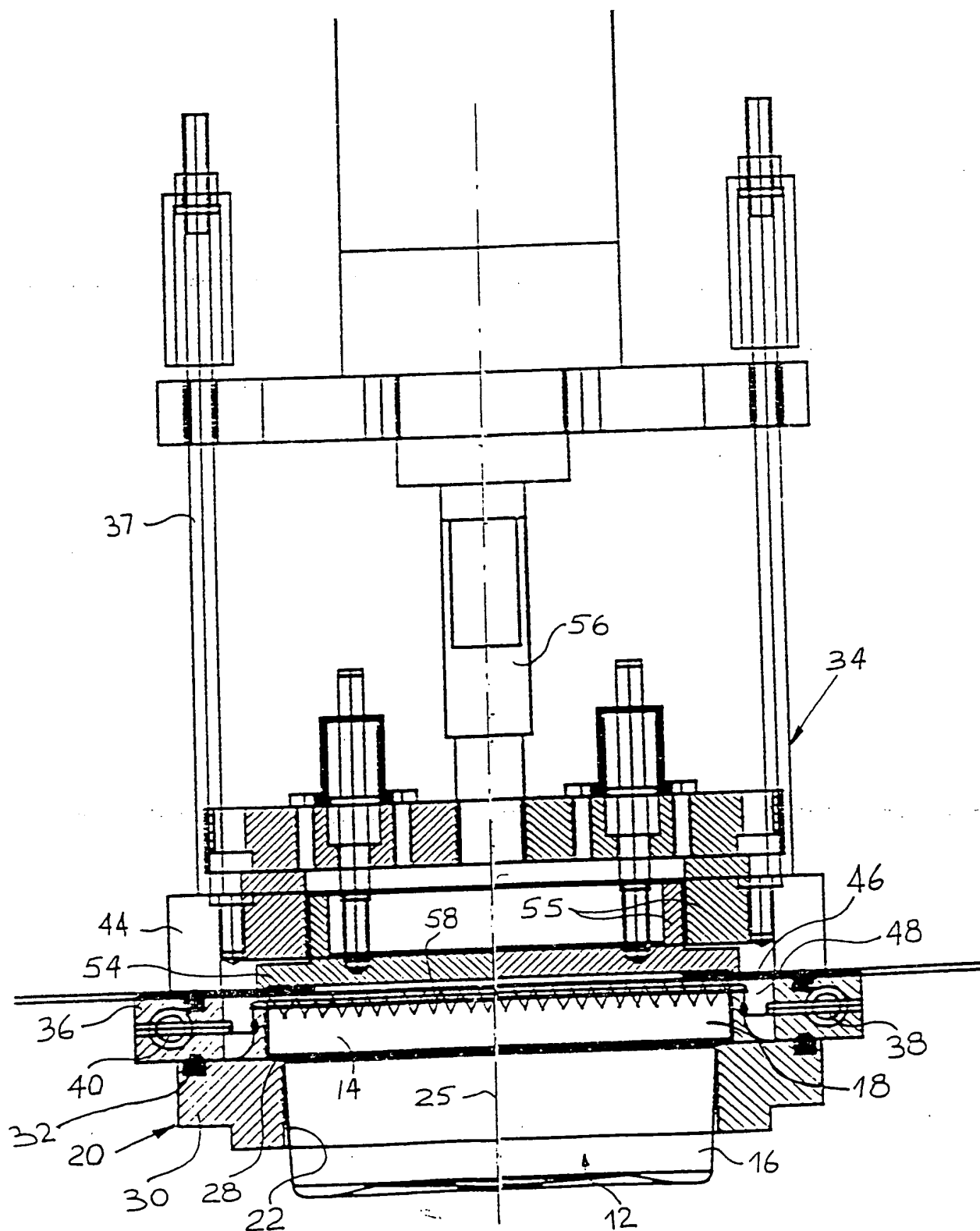


FIG. 4



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